

CLAIMS

1. An article comprising a laminate having first and second layers and a tie-layer therebetween bonding the first and second layers, the inner and outer layers
5 formed, respectively, of first and second polymer materials, the first and second polymer materials being different, wherein
the first and second polymer materials, respectively, have first and second
functional groups thereon,
the tie layer is formed of a tie-layer polymer material obtained by melt
10 modification of one the first or the second polymer materials, said melt
modification comprising incorporation therein of at least 5% by weight of
a coupling agent, the coupling agent having functional groups thereon, at
least some of which are reactive in the melt with at least the functional
groups on the other of said first and second polymer materials.
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2. An article as in claim 1 wherein the coupling agent functional groups
further comprise functional groups which are reactive in the melt with the functional
groups of said one of the first and second polymer materials.
- 20 3. An article as in claim 1 wherein the tie layer polymer has been
irradiatively crosslinked.
4. An article as in claim 1 wherein the first polymer material is a polyester.
- 25 5. An article as in claim 4 where the second polymer material is a polyolefin
or a polyamide.
6. An article as in claim 5 wherein the tie layer polymer material is a
modified polyolefin or polyamide.
- 30 7. An article as in claim 1 wherein the first polymer material is a polyester
or a polyamide, the second polymer material is a polyolefin and the tie layer material is
obtained by modifying the second polymer material.

8. An article as in claim 7 wherein at least a portion of the second polymer material and the tie-layer polymer material have been crosslinked after formation of the laminate.
- 5 9. An article as in claim 1 wherein the coupling agent is a member of the group consisting of anhydrides of polycarboxylic acids, polyepoxides, polyoxazalines, polycarbodiimides, and polyisocyanates.
- 10 10. An article as in claim 9 wherein the coupling agent is present in the tie layer material in an amount of from about 7% to about 35% by weight.
11. An article as in claim 1 wherein the coupling agent is incorporated into the tie layer material in an amount of 10-20% by weight.
- 15 12. An article as in claim 1, the tie layer material further comprising a catalyst for reaction of the coupling agent with functional groups on said other of said first and second polymer materials.
- 20 13. An article as in claim 12 wherein the catalyst is selected from the group consisting of tri-valent phosphorous compounds, pentavalent phosphoric compounds, tin compounds, titanate compounds, tertiary amines, blocked amines, and mixtures thereof.
- 25 14. An process for producing laminate article comprising coextruding a first polymer material layer, a tie layer and a second polymer layer, the first and second polymer materials comprising different polymers having, respectively, first and second functional groups thereon, wherein
- 30 the tie layer is formed of a tie-layer polymer material, and the tie layer polymer material obtained by melt modifying one of the first or the second polymer materials, said melt modification comprising incorporating into the tie layer material at least 5% by weight of a coupling agent, the coupling agent having functional groups thereon, at least some of which are reactive in the melt with at least the functional groups on the other of said first and second polymer materials.

15. A process as in claim 14 wherein the coupling agent functional groups further comprise functional groups which are reactive in the melt with the functional groups of said one of the first and second polymer materials.
- 5 16. A process as in claim 14 wherein the tie layer polymer has been irradiatively crosslinked.
17. A process as in claim 14 wherein the first polymer material is a polyester.
- 10 18. A process as in claim 17 where the second polymer material is a polyolefin or a polyamide.
19. A process as in claim 18 wherein the tie layer polymer material is a modified polyolefin or polyamide.
- 15 20. A process as in claim 14 wherein the first polymer material is a polyester or a polyamide, the second polymer material is a polyolefin and the tie layer material is obtained by modifying the second polymer material.
- 20 21. A process as in claim 20 wherein at least a portion of the second polymer material and the tie-layer polymer material have been crosslinked after formation of the laminate.
- 25 22. A process as in claim 14 wherein the coupling agent is a member of the group consisting of anhydride compounds, polyepoxide compounds, polyoxazalines, polycarbodiimides, and polyisocyanates.
23. A process as in claim 22 wherein the coupling agent is present in the tie layer material in an amount of from about 7% to about 35% by weight.
- 30 24. A process as in claim 14 wherein the coupling agent is incorporated into the tie layer material in an amount of 10-20% by weight.

25. A process as in claim 14, the tie layer material further comprising a catalyst for reaction of the coupling agent with functional groups on said other of said first and second polymer materials.
- 5 26. A process as in claim 25 wherein the catalyst is selected from the group consisting of tri-valent phosphorous compounds, pentavalent phosphoric compounds, tin compounds, titanate compounds, tertiary amines, blocked amines, and mixtures thereof.
- 10 27. A method for preparing a laminate which comprises melt extruding first and second layers of different polymers, with an adjoining tie layer between the first and second layers, wherein the tie layer is a melt modified product of one of the two different polymers and a coupling agent that is reactive with at least the other of the two different polymers.
- 15 28. A method as in claim 27 wherein, in the tie layer, the coupling agent comprises about 0.5% or more.
- 20 29. A method as in claim 27 wherein the coupling agent is a member of the group consisting of anhydrides of polycarboxylic acids, polyepoxides, polyoxazalines, polycarbodiimides, and polyisocyanates.
- 25 30. A laminate which comprises first and second layers of different polymers, with an adjoining tie layer between the first and second layers, wherein the tie layer is a melt modified product of one of the two different polymers and a coupling agent that is reactive with at least the other of the two different polymers.